



J-U-B ENGINEERS, Inc.

1.2

N. W. Crossing Office Building, Suite 201
2810 West Clearwater Avenue

Kennewick, Washington 99336

Telephone: (509) 783-2144

June 29, 1984

Mr. Larry Peterson
Washington State Dept.
of Ecology
E. 103 Indiana
Spokane, WA 99207

July 9 sampling results
Well 1 .01 mg/l
Well 2 .03 mg/l
Control <.01 mg/l

Re: Pasco Sanitary Landfill Groundwater Monitoring

Dear Mr. Peterson:

Groundwater monitoring was conducted for the sixth time in March 1984. Three additional parameters were added to the list of species analyzed over previous monitoring efforts. These three additional parameters were sodium, sulfate and total organic carbon. These parameters were measured because they would be additional indicators of potential groundwater contamination. The detailed results of the monitoring effort are provided in Attachment 1 and Attachment 2. Attachment 1 is a set of tables showing all measurements conducted over time at each of the individual monitoring well locations. Attachment 2 is the statistical analysis comparing the concentration of each of the parameters at the control well to concentrations of like parameters at down-gradient wells. The major conclusions relative to the 1984 work are as follows:

Iron is the only parameter present in concentrations in excess of the EPA maximum allowable concentrations. Average iron concentrations at the control well, well #1, #3 and #4 remain above the EPA maximum allowable concentration of 0.3 mg/l. It cannot be concluded that these iron concentrations are from the fill or waste disposal activities since iron concentrations are highest at the up-gradient control well. These concentrations are felt to be reflective of soil conditions in the area.

Iron and total dissolved solids were the only parameters found in significantly different concentrations at the down-gradient wells than at the up-gradient control well. Manganese concentrations were significantly lower at down-gradient wells #3 and #4 than manganese concentrations measured at the

USEPA SF



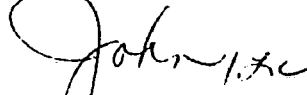
1452397

control well. Again, fill activities are not considered to be responsible for any alterations in the manganese concentrations. Fill activities may be responsible for a statistically higher concentration of total dissolved solids at well #4 than at the control well. While the concentration at this location is somewhat elevated the average concentration at well #4 (482 mg/l) is below the EPA allowable maximum concentration of 500 mg/l.

The phenol concentrations measured during this sampling were markedly higher at the control well, #1 and well #2 than had been observed on the five previous surveys. Concentrations at these wells were approximately 0.5 mg/l, while previous readings were all at least an order of magnitude lower. These wells are being resampled and the samples will be reanalyzed. We will inform you of these results.

If you have any questions concerning this information, please call me at 586-6471.

Sincerely,



John A. Zillich
Waste Management and
Environmental Specialist

JAZ:vl

Attachments

cc: Larry Kamberg, Benton-Franklin Health Dept.
Bob Boothe, Franklin County Planner



RECOMMENDATION FOR ENFORCEMENT ACTION

MEMO TO: Enforcement Officer

DATE: February 17, 1984

FROM: Lawrence N. Peterson

(Full Name of Investigator)

(509) 456-2926

(Public Telephone Number)

RECOMMEND ENFORCEMENT ACTION BE TAKEN AGAINST:

I. Pasco Sanitary Landfill, Inc./Attention: Mr. Larry Dietrich

P. O. Box 424

(Name: Company, Individual, Municipality, County, etc.)

Pasco,

WA

99301

II. For:

(Address)

(Zip Code)

A. Violation of Water Well Construction Act of 1971, Chapter 18.104 RCW.

1. Specific paragraph RCW/WAC

2. Failure to submit a well report for a well drilled for

(Name of Wellowner)

(Address)

(Permit Number)

B. Violation of Clean Air Act, Chapter 70.94 RCW. Specific paragraph RCW/WAC

C. Violation of Flood Control Laws, Chapter 86.16 RCW. Specific paragraph RCW/WAC

D. Denial of water right application Number

Volume of withdrawal or diversion

Proposed use

(RCW 90.03.290)

E. Violation of Water Resources Laws, Title 90 RCW. (Reference RCW 43.27A)
Specific paragraph RCW/WAC

F. Unlawful discharge of wastes into public waters, RCW 90.48.080.

XX G. Water Quality Regulatory Notice and Order, RCW 90.48.120.

H. Noncompliance with waste discharge permit, RCW 90.48.180. (Include a copy of page 1 and the page of the permit containing the condition violated)

I. Intentional or negligent discharge of oil into state waters, RCW 90.48.350.

1. Type of oil (diesel, gasoline, fuel, bunker C, crude, etc.)

2. Amount of oil spilled

gallons/barrels.

J. Modification of Water Quality Criteria, WAC 173-201-100(2).

K. Other

situation

III. The violation occurred at: (Time)

Ongoing.

(Date)

IV. Location of the incident/activity: Groundwaters of the state.

V. Name of watercourse involved:

N/A

Class: N/A

Date: February 17, 1984

RECOMMENDATION FOR ENFORCEMENT ACTION

Name of Company or Individual: Pasco Sanitary Landfill, Inc.VI. Narrative of incident/situation: (Use separate page or memo if necessary)
See attached memo.

VII. Physical evidence obtained: Samples _____ Pictures _____ Other _____

VIII. Names and addresses: _____

IX. Recommended penalty OR regulatory action to be taken: See attached memo.

Enclosures

Lab Report, No. _____

Pictures _____

L. N. Peterson
(Investigated by) L. N. PetersonAssistant District Supervisor
(Title)

ENDORSEMENT

TO: Regional Manager

FROM: Division Supervisor

We have taken the following actions within the Region to resolve this problem:

See attached memo.Charles R. Springsteen
(E. Q. Supervisor)Carl [Signature]
(District Supervisor)[Signature]
(District Engineer)

TO: Enforcement Officer/Assistant Director

FROM: Regional Manager

Recommend enforcement action be taken as proposed.

John X. Amgenito
(Regional Manager)2/21/84
(Date)

MEMORANDUM

CHECK
INFORMATION
FOR ACTION
PERMIT _____
OTHER _____State of
Washington
Department
of Ecology

TO: Gail Keyes

FROM: Lawrence Peterson

SUBJECT: ORDER for Pasco Sanitary Landfill, Inc.

DATE: February 17, 1984

VI.

Pasco Sanitary Landfill, Inc. operates a waste disposal operation that serves the Benton-Franklin area. The landfill serves as the commercial/residential waste disposal site for the Tri-Cities. A lagoon system provides a disposal service for septic tank haulers areawide.

The current lagoon was preceded by an adjacent lagoon (pit) that was abandoned when the bottom and walls became sealed and evaporation was insufficient to provide space for incoming wastewater. During the period 1972 through 1974, the area was a designated industrial waste disposal site. This portion of the property received thousands of tons of waste that would now be designated dangerous and/or extremely hazardous. It was handled in a "state of the art" manner at that time and the site is now classified as closed.

The existing lagoon is the subject of this enforcement request. It has been in operation for approximately five years. As with its predecessor, natural sealing has taken place and an adjacent area was excavated to provide overflow capacity. Utilization of the overflow area was hastened by abnormal volumes received during the construction boom caused by the Washington Public Power Supply System activities at Hanford. Most of the waste received was of chemical toilet origin and was characteristic of raw sewage. This was, in fact, the reason Eastern Regional Office staff became involved in the regulation of the operation. Volumes have receded and the percentage of chemical toilet wastes has lessened in the last two years. However, the facility does continue to overflow during wet periods of the year and the waste contains some untreated sewage.

The pressing problem is that wastewater applied to the primary lagoon is provided settling time and the supernatant carried over to the new pond contains few solids and there is little sealing taking place. The high percolation rate resulting from the overflow is unacceptable. There is some potential for migrating wastewater to influence the closed industrial waste site.

Action to correct this situation was initiated in late 1980. Two problems came to light during subsequent communication with the company and local health officials. First, the company was reluctant to initiate costly construction when a planned hydrogeologic study and associated water quality monitoring program might force early closure of the facility.

ECY 010-4

TO: Gail Keyes - Page 2

FROM: Lawrence Peterson

SUBJECT: ORDER for Pasco Sanitary Landfill, Inc.

DATE: February 17, 1984

State of
Washington
Department
of Ecology



Second, the closure of the existing facility would cause considerable difficulty to local officials due to the absence of alternate septage disposal sites. A decision was made to allow continued use of this system, with interim operating measures in place to prevent dumping of inappropriate wastes.

Sub Engineers
The hydrogeologic report and facility analysis indicated that wastewater from the overflow pond was reaching, or could reach, groundwater. The results of an ongoing water quality monitoring program indicated little or no groundwater degradation is occurring. No impact from the industrial waste site or associated influence from the treatment facility has been detected.

It was concluded by this office that continued operation of a sealed, non-overflow lagoon posed no significant threat to groundwater. Pasco Sanitary Landfill was informed that they must submit Plans and Specifications for, and subsequently construct, an approved facility. Following submittal of the final element of a groundwater quality analysis required by this office in 1981, the company requested continued operation without upgrading the facility. This request was based on demonstrated lack of impact on groundwater.

Considerable time and effort has been expended by regional staff in explaining the provisions of RCW 90.48 pertaining to this situation. Our position is clear to all concerned. There is a possibility that further effort to solicit voluntary compliance will result in delay and, perhaps, an abrupt closure of the facility. The latter would likely disrupt septic tank pumping services and cause illegal disposal problems.

The Pasco Sanitary Landfill, Inc. wastewater disposal activities do not comply with RCW 90.48.110 ("Plans and Specifications"/WAC 173-240) and RCW 90.48.010 ("Use of all known available and reasonable methods to prevent and control the pollution of waters of the State of Washington.")

IX.

We recommend that an ORDER be issued pursuant to RCW 90.48.120 that requires the following:

MEMORANDUM

CHECK
INFORMATION _____
FOR ACTION _____
PERMIT _____
OTHER _____

TO: Gail Keyes - Page 3

FROM: Lawrence Peterson

SUBJECT: ORDER for Pasco Sanitary Landfill, Inc.

DATE: February 17, 1984

State of
Washington
Department
of Ecology



1. Immediate action that prevents further overflow from the primary lagoon to the overflow pond.
2. Submit for approval to the Eastern Regional Office not later than May 31, 1984, Plans and Specifications for an upgraded treatment facility.
3. Construct a treatment facility according to approved Plans and Specifications or cease all activities and submit a Closure Plan for the existing facility prior to November 1, 1984.

LNP:adw

ECY 010-4

File:
Pasco Sanitary
Landfill/Franklin Co

AP
RECEIVED

SEP 29 1982

Mr. Lawrence D. Kamberg, R.S.
Supervisor
Environmental Health Surveillance
Section
Benton-Franklin District
Health Department
506 McKenzie
Richland, WA 99352

DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Re: Pasco Landfill-Conditional Use
Permit

Dear Mr. Kamberg:

I am writing in response to your May 14, 1982 letter on the Pasco Sanitary Landfill Conditional Use Permit. I am requesting the Benton-Franklin County Health Department's approval of this conditional use permit.

The attached figure illustrates the landfill site as it currently exists. The figure illustrates the locations of the industrial waste sites and the solid waste disposal sites. Also included on the figure is the normal groundwater flow patterns as determined from groundwater elevation measurements in existing wells. Given the directional flow of the groundwater, the location of the solid waste disposal area in the north part of the site and the location of the additional new ground, I believe a groundwater monitoring well should be placed at the location indicated near the northeast corner of Section 21. Such a well will monitor any potential leachate from the existing solid waste disposal area and will also cover potential leachate from a good portion of the newly acquired ground. Once we have a well log from the new monitoring well and we couple this information with the well log from the control well and off-site well #8, we will be able to construct an excellent hydrological and geological cross sectional profile as you requested in your May 14, 1982 letter.

If this meets with your approval, please contact me by phone and I will proceed immediately with drilling. I look forward to receiving your approval of my conditional use permit.

Sincerely,

John A. Zillich
Larry Dietrich
Pasco Sanitary Landfill

December 3, 1979

Claude
Cesar
State Waste Disch. perm. file!
Franklin Co.

Mr. Larry Dietrich
Resource Recovery, Inc.
420 East Ainsworth
Pasco, Washington 99301

Dear Mr. Dietrich:

Your plans for expanding the existing septage disposal facilities at your landfill have been forwarded to me for review by the Benton-Franklin District Health Department. We have also examined the provisions of the Health Department's approval letter and would offer the following comments:

- 1) We would suggest the sidewalls of the lagoon be sloped to at least 3:1 rather than 1:1.
- 2) A 90° elbow should be used to invert the outlet pipe in the smaller lagoon to prevent plugging with floating debris.
- 3) We will require you to apply for a state waste discharge permit for the entire septage operation. After receiving your application, we will meet with you and the Health Department to determine if ground water monitoring will be required to protect the shallow aquifer. Also, we will outline the record keeping requirements of the disposal operation. These may include but not necessarily be limited to, a listing of disposed materials and the quantities involved.
- 4) After the lagoon is in operation you should investigate the need for stabilizing the sand dikes to prevent wind and wave erosion.

Should you have any questions about these comments please don't hesitate to call me at (509) 456-6198.

Sincerely,

Phil H. Williams
District Supervisor
Environmental Quality Division

PHW:cac

cc: Larry Kamberg, Benton-Franklin Health Department
Jim Malm, Spokane DOE

Soils in surround
Ref. Rec. Map

278-247

9 N

Lewis Street

27

midpoint, sec. 27+28, T9N, R30E, north of Lewis Street
(no soils info. for section
28)

Highway

278-189

VA0064

SOIL INTERPRETATIONS RECORD

QUINCY SERIES

MLRA(S): 7, 10, 11, 11A, 11B, 25
 REV. CDL, GLR, 9-81
 XERIC TORRIPSAMMENTS, MIXED, MESIC

THE QUINCY SERIES CONSISTS OF DEEP, EXCESSIVELY DRAINED SOILS FORMED IN EOLIAN SAND. THE PARENT MATERIALS ARE MAINLY GRANITIC, QUARTZITIC, AND BASALTIC SAND. THESE NEARLY LEVEL TO STEEP SOILS HAVE RIDGED, HUMMOCKY, DUNELIKE RELIEF. VEGETATION IS GRASS. MAAT IS 52F. MAP IS 6 TO 12 INCHES. FFS IS 100 TO 190 DAYS. TYPICALLY, THE PROFILE IS A GRAYISH-BROWN FINE SAND THAT EXTENDS TO 60 INCHES OR MORE. SLOPES RANGE FROM 0 TO 40 PERCENT.

ESTIMATED SOIL PROPERTIES														
DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHTO	FRACT >3 IN (PCT)	PERCENT OF MATERIAL LESS THAN 3" PASSING SIEVE NO.				LIQUID LIMIT	PLAS- TICITY INDEX				
					4	10	40	200						
0-15	FS, S	SM, SP-SM	A-2, A-3	0	100	100	75-90	5-20	-	NP				
0-15	LFS, LS	SM	A-2	0	100	100	85-100	15-30	-	NP				
15-60	LFS, FS, S	SM	A-2	0 0-5	100 95-100	100 95-100	65-80 60-80	10-30 5-30	-	NP				
DEPTH (IN.)	CLAY (PCT)	MOIST BULK DENSITY (G/CM3)	PERMEA- BILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK- SWELL POTENTIAL	EROSION FACTORS K T GROUP	WIND EROD. MATTER (PCT)	ORGANIC MATTER (PCT)	CORROSIVITY			
0-15	1-6	-	6.0-20	0.08-0.11	6.1-8.4	-	LOW	.17 5 1	.5-1		HIGH	LOW		
0-15	1-6	-	6.0-20	0.11-0.15	6.1-8.4	-	LOW	.17 5 2	.5-1					
15-60	1-7	-	6.0-20	0.06-0.09	6.6-8.4	-	LOW	.17						
FLOODING				HIGH WATER TABLE			CEMENTED PAN		BEDROCK		SUBSIDENCE		HYD POTENTIAL	
				DEPTH (FT)	KIND	MONTHS	DEPTH (IN)	HARDNESS	DEPTH (IN)	HARDNESS	INIT. (IN)	TOTAL (IN)	GRP (IN)	FROST ACTION
FREQUENCY				DURATION MONTHS										
NONE				>6.0										A LOW

SANITARY FACILITIES				CONSTRUCTION MATERIAL			
SEPTIC TANK ABSORPTION FIELDS	0-15%: SEVERE-POOR FILTER 15+%: SEVERE-POOR FILTER, SLOPE			ROADFILL	0-15%: GOOD 15-25%: FAIR-SLOPE 25+%: POOR-SLOPE		
SEWAGE LAGOON AREAS	0-7%: SEVERE-SEEPAGE 7+%: SEVERE-SEEPAGE, SLOPE			SAND	IMPROBABLE-EXCESS FINES		
SANITARY	0-15%: SEVERE-TOO SANDY 15+%: SEVERE-SLOPE, TOO SANDY				IMPROBABLE-EXCESS FINES		

ILL CH)		LEVEL	
SANITARY LANDFILL (AREA)	0-8%: SLIGHT 8-15%: MODERATE-SLOPE 15+X: SEVERE-SLOPE	TOPSOIL	0-8% LS,LFS: FAIR-TOO SANDY 8-15% LS,LFS: FAIR-TOO SANDY,SLOPE 15+X LS,LFS: POOR-SLOPE 0-15% FS,S: POOR-TOO SANDY 15+X FS,S: POOR-TOO SANDY,SLOPE
DAILY COVER FOR LANDFILL	0-15%: POOR-TOO SANDY 15+X: POOR-TOO SANDY,SLOPE	POND RESERVOIR AREA	WATER MANAGEMENT 0-8%: SEVERE-SEEPAGE 8+X: SEVERE-SEEPAGE,SLOPE
BUILDING SITE DEVELOPMENT			
SHALLOW EXCAVATIONS	0-15%: SEVERE-CUTBANKS CAVE 15+X: SEVERE-CUTBANKS CAVE,SLOPE	EMBANKMENTS DIKES AND LEVEES	SEVERE-SEEPAGE,PIPING
DWELLINGS WITHOUT BASEMENTS	0-8%: SLIGHT 8-15%: MODERATE-SLOPE 15+X: SEVERE-SLOPE	EXCAVATED PONDS AQUIFER FED	SEVERE-NO WATER
DWELLINGS WITH BASEMENTS	0-8%: SLIGHT 8-15%: MODERATE-SLOPE 15+X: SEVERE-SLOPE	DRAINAGE	DEEP TO WATER
SMALL COMMERCIAL BUILDINGS	0-4%: SLIGHT 4-8%: MODERATE-SLOPE 8+X: SEVERE-SLOPE	IRRIGATION	DROUGHTY,FAST INTAKE,SOIL BLOWING
LOCAL ROADS AND STREETS	0-8%: SLIGHT 8-15%: MODERATE-SLOPE 15+X: SEVERE-SLOPE	TERRACES AND DIVERSIONS	0-8%: TOO SANDY,SOIL BLOWING 8+X: SLOPE,TOO SANDY,SOIL BLOWING
LAWNS, LANDSCAPING AND GOLF FAIRWAYS	0-8% FS,LFS,LS: MODERATE-DROUGHTY 8-15% FS,LFS,LS: MODERATE-DROUGHTY,SLOPE 0-8% S: MODERATE-DROUGHTY,TOO SANDY 8-15% S: MODERATE-DROUGHTY,SLOPE,TOO SANDY 15+X: SEVERE-SLOPE	GRASSED WATERWAYS	0-8%: DROUGHTY 8+X: SLOPE,DROUGHTY
REGIONAL INTERPRETATIONS			

RECREATIONAL DEVELOPMENT			
CAMP AREAS	0-8% LS,LFS: SLIGHT	PLAYGROUNDS	0-2% LS,LFS: SLIGHT
	8-15% LS,LFS: MODERATE-SLOPE		2-6% LS,LFS: MODERATE-SLOPE
	15+% LS,LFS: SEVERE-SLOPE		6+% LS,LFS: SEVERE-SLOPE
	0-15% FS,S: SEVERE-TOO SANDY		0-6% FS,S: SEVERE-TOO SANDY
	15+% FS,S: SEVERE-SLOPE,TOO SANDY		6+% FS,S: SEVERE-SLOPE,TOO SANDY
PICNIC AREAS	0-8% LS,LFS: SLIGHT	PATHS AND TRAILS	0-15% LS,LFS: SLIGHT
	8-15% LS,LFS: MODERATE-SLOPE		15-25% LS,LFS: MODERATE-SLOPE
	15+% LS,LFS: SEVERE-SLOPE		25+% LS,LFS: SEVERE-SLOPE
	0-15% FS,S: SEVERE-TOO SANDY		0-25% FS,S: SEVERE-TOO SANDY
	15+% FS,S: SEVERE-SLOPE,TOO SANDY		25+% FS,S: SEVERE-TOO SANDY,SLOPE

CLASS- DETERMINING PHASE	CAPABILITY		WHEAT, WINTER		ALFALFA HAY		PASTURE		POTATOES, IRISH		ALFALFA SEED		CORN		APPLES	
			(BU)		(TONS)		(AUM)		(CWT)		(LBS)		(BU)		(BU)	
	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR	NIRR	IRR
0-15% LS,LFS	7E	4E		100		7.0		15		500				130		630
15+% LS,LFS	7E	6E														630
0-2% COOL	7E	4E		40		3.5		7		215		375				
2-12% COOL	7E	4E		25		2.0		5		170		350				
0-15% FS	7E	4E		80		5.0		13		360						
ERODED	7E	4E		70		5.0		13		360				120		

CLASS- DETERMINING PHASE	ORD SYM	WOODLAND SUITABILITY					POTENTIAL PRODUCTIVITY		TREES TO PLANT
		MANAGEMENT PROBLEMS					COMMON TREES	SITE INDX	
		EROSION HAZARD	EQUIP. LIMIT	SEEDLING MORT.Y.	WINDTH. HAZARD	PLANT COMPET.			
							NONE		

TERMINING PHASE				WINDBREAKS			
CLASS	TERMINING PHASE	SPECIES	HT	SPECIES	HT	SPECIES	HT
IRR		LOMBARDY POPLAR	65	AUSTRIAN PINE	40	PEKING COTONEASTER	5
		RUSSIAN-OLIVE	30	LILAC	20	GOLDEN WILLOW	35
		GREEN ASH	50	BLUE SPRUCE	20	NORTHERN WHITE-CEDAR	25
						ROCKY MT. JUNIPER	20

WILDLIFE HABITAT SUITABILITY

CLASS- DETERMINING PHASE	POTENTIAL FOR HABITAT ELEMENTS										POTENTIAL AS HABITAT FOR:			
	GRAIN & SEED	GRASS & LEGUME	WILD HERB.	HARDWD TREES	CONIFER PLANTS	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENLD WILDLF	WOODLD WILDLF	WETLAND WILDLF	RANGELD WILDLF		
0-15% IRR	FAIR	FAIR	FAIR	FAIR	FAIR	FAIR	V. POOR	V. POOR	FAIR	-	V. POOR	-		
15+% IRR	POOR	FAIR	FAIR	FAIR	FAIR	FAIR	V. POOR	V. POOR	FAIR	-	V. POOR	-		
NIRR	V. POOR	V. POOR	POOR	-	-	POOR	V. POOR	V. POOR	POOR	-	V. POOR	POOR		

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION)

COMMON PLANT NAME	PLANT SYMBOL (NLSN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS DETERMINING PHASE					
		WARM	COOL				
NEEDLEANDTHREAD	STCO4	45	15				
SANDBERG BLUEGRASS	POSE	5	3				
BIG SAGEBRUSH	ARTR2	5	10				
THICKSPIKE WHEATGRASS	AGDA	1	2				
OTHER PERENNIAL GRASSES	PPGG	5					
ANTELOPE BITTERBRUSH	PUTR2	5					
OTHER SHRUBS	SSSS	5					
THURBER NEEDLEGRASS	STTH2	-	5				
GRAY RABBITBRUSH	CHNA2		5				
GRAY HORSEBRUSH	TECA2		5				
INDIAN RICEGRASS	ORHY	20	30				
OTHER PERENNIAL FORBS	PPFF	5	10				
POTENTIAL PRODUCTION (LBS./AC. DRY WT):							
FAVORABLE YEARS		700	750				
NORMAL YEARS		500	500				
UNFAVORABLE YEARS		250	250				

FOOTNOTES

1 POSSIBLE HAZARD OF GROUNDWATER CONTAMINATION.

~~QUINCY~~ QUINCY LOAMY FINE SAND, 0 TO 15 PERCENT SLOPES. \$11 THIS VERY DEEP, SOMEWHAT EXCESSIVELY DRAINED SOIL IS ON TERRACES AND DUNES. IT FORMED IN SAND DERIVED FROM MIXED SOURCES. THE NATIVE VEGETATION IS MAINLY GRASSES AND SHRUBS. ELEVATION IS ~~400~~³⁵⁰ TO ~~7200~~¹⁰⁰⁰ FEET. THE AVERAGE ANNUAL PRECIPITATION IS ABOUT 7 INCHES, THE AVERAGE ANNUAL TEMPERATURE IS ABOUT 52 DEGREES F, AND THE AVERAGE FROST-FREE SEASON IS ABOUT ~~180~~¹⁹⁰ DAYS.

TYPICALLY, THE SURFACE LAYER IS GRAYISH BROWN LOAMY FINE SAND 4 INCHES THICK. THE UPPER PART OF THE UNDERLYING MATERIAL IS LIGHT BROWNISH GRAY LOAMY FINE SAND 46 INCHES THICK. THE LOWER PART TO A DEPTH OF 60 INCHES OR MORE IS LIGHT BROWNISH GRAY FINE SAND.

\$101 PERMEABILITY OF THIS QUINCY SOIL IS RAPID. AVAILABLE WATER CAPACITY IS LOW. EFFECTIVE ROOTING DEPTH IS 60 INCHES OR MORE. RUNOFF IS SLOW, AND THE HAZARD OF WATER EROSION IS SLIGHT. THE HAZARD OF SOIL BLOWING IS HIGH.

\$101 INCLUDED IN THIS UNIT IS ABOUT 25 PERCENT HEZEL LOAMY FINE SAND, ROYAL LOAMY FINE SAND, TIMMERMAN LOAMY SAND, QUINCY FINE SAND, BURBANK LOAMY FINE SAND, AND QUINCY SOILS THAT HAVE SLOPES OF MORE THAN 15 PERCENT.

\$101 THIS UNIT IS USED FOR IRRIGATED CROPS, RANGELAND, IRRIGATED HAY AND PASTURE, AND HOMESITES.

\$101 IF THIS UNIT IS USED FOR IRRIGATED CROPS, THE MAIN LIMITATIONS ARE STEEPNESS OF SLOPE, THE LOW AVAILABLE WATER CAPACITY, AND THE HAZARD OF SOIL BLOWING. THE MAIN IRRIGATED CROPS ARE POTATOES, CORN, SMALL GRAIN, ALFALFA, AND GRASSES.

\$101 SPRINKLER, DRIP, OR TRICKLE IRRIGATION IS SUITED TO THIS UNIT. BECAUSE OF THE LOW AVAILABLE WATER CAPACITY, MOST CROPS NEED FREQUENT, LIGHT APPLICATIONS OF WATER. LAND SMOOTHING OPERATIONS

THAT INCLUDE DEEP CUTS ARE FEASIBLE ON THIS UNIT.

\$101 USING A CROPPING SYSTEM THAT INCLUDES CLOSE-GROWING, HIGH-RESIDUE CROPS IN THE ROTATION AND MAINTAINING CROP RESIDUE ON THE SURFACE REDUCE EROSION. WINTER COVER CROPS ALSO PROTECT THE SOIL FROM EROSION. IF MAINTAINED ON THE SURFACE, RESIDUE FROM THESE CROPS REDUCES SOIL BLOWING IN SPRING. SOIL BLOWING IS ALSO REDUCED BY PRACTICING MINIMUM TILLAGE, WHICH REDUCES PULVERIZATION OF THE SOIL.

\$101 THE POTENTIAL PLANT COMMUNITY ON THIS UNIT IS MAINLY NEEDLEANDTHREAD, INDIAN RICEGRASS, SANDBERG BLUEGRASS, ~~BLUEBUNCH WHEATGRASS~~ AND BIG SAGEBRUSH. THE PRODUCTION OF FORAGE IS LIMITED BY THE LOW AVAILABLE WATER CAPACITY. IF THE RANGE IS OVERGRAZED, THE PROPORTION OF PREFERRED FORAGE PLANTS SUCH AS NEEDLEANDTHREAD DECREASES AND THE PROPORTION OF LESS PREFERRED FORAGE PLANTS SUCH AS RABBITBRUSH AND CHEATGRASS INCREASES. AREAS THAT ARE HEAVILY INFESTED WITH UNDESIRABLE SHRUBS CAN BE IMPROVED BY SUCH METHODS AS RAILING, CHAINING, BEATING, AND CHEMICAL TREATMENT. SEEDING ON THIS UNIT GENERALLY IS NOT PRACTICAL BECAUSE OF THE HAZARD OF SOIL BLOWING, THE LOW ANNUAL PRECIPITATION, AND THE LOW AVAILABLE WATER CAPACITY.

\$101 THIS UNIT IS WELL SUITED TO HOMESITE DEVELOPMENT. SOIL BLOWING CAN BE A PROBLEM ON CONSTRUCTION SITES. CUTBANKS ARE NOT STABLE AND ARE SUBJECT TO CAVING IN. MULCHING, FERTILIZATION, AND IRRIGATION ARE NEEDED TO ESTABLISH LAWN GRASSES AND OTHER SMALL PLANTS.

\$101 THE MAIN LIMITATION FOR SEPTIC TANK ABSORPTION FIELDS IS THE RISK OF SEEPAGE. IF THE DENSITY OF HOUSING IS MODERATE TO HIGH, COMMUNITY SEWAGE SYSTEMS ARE NEEDED TO PREVENT CONTAMINATION OF

NEARBY WATER SUPPLIES.

\$101 THIS MAP UNIT IS IN CAPABILITY SUBCLASSES IVe, IRRIGATED, AND
VIIe, NONIRRIGATED.